

CEAS International Forum
on Aeroelasticity and
Structural Dynamics
1997

Informal Conference Proceedings

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Short Summary

Introduction

The Confederation of European Aerospace Societies (*CEAS*) comprises the Association Aéronautique et Astronautique de France (AAAF), the Asociación de Ingenieros Aeronáuticos de España (AIAE), the Associazione Italiana di Aeronautica e Astronautica (AIDAA), the Deutsche Gesellschaft für Luft- und Raumfahrt (DGLR), the Nederlandse Vereniging voor Luchtvaarttechniek (NVvL), and the Royal Aeronautical Society (RAeS). The *CEAS* International Forum on Aeroelasticity and Structural Dynamics 1997 has been held at the College of Engineering of the University of Rome "La Sapienza" on 17-20 June 1997. The Forum has been intended to give a comprehensive survey of the current status of research and development work in these fields for both aircraft and spacecraft. In addition to the formal delivery of papers, an important objective of this Forum is to provide an opportunity for informal exchanges of opinions and experience between participants.

Participants

The total number of participants is **152**, from 19 different countries. In particular, they came from:

| Country | Number |
|----------------|--------|
| Italy | 53 |
| Germany | 22 |
| USA | 22 |
| UK | 16 |
| France | 12 |
| Japan | 5 |
| Israel | 3 |
| The Netherland | 3 |
| Russia | 2 |
| Singapore | 2 |
| South Africa | 2 |
| Spain | 2 |
| Sweden | 2 |
| Austria | 1 |
| Belgium | 1 |
| Brazil | 1 |
| India | 1 |
| Poland | 1 |
| Turkey | 1 |

The complete list of participants is given in the Appendix.

Main Trust

As clear from the title the main trust of the Forum was: Aeroelasticity and Structural Dynamics. In particular, the Forum included the following topics:

1. **Unsteady Aerodynamics and Aeroelastic Characteristics of Aerospace Structures** – Dynamic Stall, Buffeting, Buzz, Flutter Prediction Methods, Aeroelasticity in Separated Flow, Propeller Blade Aeroelasticity, Prediction of Unsteady Aerodynamic Forces Based on Experimental and Theoretical Methods, Flight Vibration and Flutter Testing Techniques, Measurement and Correction of Flexible Wind-Tunnel Models, Laminar Flow Control, Aeroelasticity Design and Qualification.
2. **Structural Modelling and Optimisation** – Analytical Modelling with Emphasis on Advanced Strategies and Reliability, Safety and Impact, Continuous Concepts

(Impedance Matrix Approach), Dynamic Substructuring and Condensation, Optimisation of Structures with special regard to Static and Dynamic Aeroelasticity and Structural Dynamic Constraints, Aeroelastic Tailoring, Structural Coupling with Internal Fluids including Acoustics and Statistical Approach, Wave Propagation and Scattering in Solids, Physical and Geometric Nonlinearities (including Thermoelastic Effects), Aspects of Multidisciplinary Design and Analytical Process Chains.

3. **Active Control and Smart Structures** – Self-sensing and Actuation, Static and Dynamic Aeroelastic Control, Active Vibration and Noise Control, Sensor/Actuator Embedding and Interrogation, Intrusion Effects, Developments in New Materials, Current Limitations of Smart Materials, Active Damping Concepts, Fault Location and Control, Optimisation of Sensor Type and Location, Flutter Suppression and Flutter Margin Augmentation emphasising Robustness and Reliability, Loads and Gust Alleviation.
4. **Certification and Qualification** – Testing for Certification, Full-scale and Small-scale Testing, Ground and Flight Testing, Replacement of Testing by Computer Simulation, Adaptation of Regulations and Requirements to Fly-by-wire Concepts, Means of Compliance, Qualification of Equipment and Payloads.
5. **Testing for Validation** – All topics related to Vibration Testing for the purpose of validating Theoretical Models of Structural Dynamics. Testing Aspects: Measurement Techniques, Modal Testing and Analysis, System Identification, Ground Vibration Testing Procedures, Special Requirements for Nonlinear Structures. Validation Procedures for Comparison and Correlation of Test and Analysis Models, Localisation of Differences between Models and Updating to Reconcile Models from both sources.

Comments

Many of the attendees volunteered comments to the effect that the Forum was very successful in that: (1) the scientific content was excellent (2) the organization was very good. No negative comments were received.

Also, everyone apparently enjoyed the social activity (visits at the Museo Capitolino and at the Museo Etrusco, banquet at the Palazzo Brancaccio). Also, positive reactions were received regarding the integration of social activities with the scientific program (e.g., visit at the Museo Capitolino before the Lecture of Prof. Paolo Santini and the Concert during the reception after the Lecture of Dr. Irving Abel of the NASA Langley Research Center).

Finally, one positive aspect that ought to be mentioned is that the Proceedings were available at the beginning of the Forum; furthermore, all the papers that were received were included in the Proceedings; specifically, only one paper (out of 113) was not included in the Proceedings. This accomplishment was achieved in spite of the fact that some of the papers were received three days before the beginning of the Forum: we wish to acknowledge the contribution of the printer *Esagrafica* in this regard.

The Future

The CEAS Specialists' Committee on Structures and Materials decided that the Forum will be held again in 1999, in Williamsburg, Virginia. Dr. Irving Abel, of NASA Langley Research Center (Hampton, VA) will be in charge of the organization.

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